Thread form advantage and non-obviousness.

The advantage of the use of the American Standard Uniform Thread Form in the design of the apparatus of the invention and reasons why selection of this particular thread form would not have been obvious to one of ordinary skill in the art:

The development of the spiral slice potato cutter required that a thread form selection be appropriate to the repeated movement of the component parts for rotation and forward movement of the potato being cut. These factors of movement are referred to as translation and in the design of a machine type apparatus, threads are selected which have a strong thread form. Heavy loads, which are repeatedly moved in operation of a machine, dictate use of a thread with a strong thread form. Such threads are commonly referred to as translation threads. Many types of machinery design applications can be found using translation threads

that are square, acme or buttress. In the search for the apparatus of the invention all prior art were found to employ one of these three translation thread forms in their design. In addition to their strength, square and acme threads are deemed the most efficient of translation threads for component parts movement. Buttress threads are employed for translation loads in one direction only. These three thread types are also simpler in the design of an engagement device comprising either single or multiple teeth. In each of these three thread forms the straighter sides are nearly perpendicular to the thread axis which greatly simplifies engagement and disengagement. However each of these three thread types are very costly to manufacture, such costs being prohibitive to the economic manufacture of a hand operated kitchen tool such as a potato slicer.

It was not initially apparent that the American Standard Uniform Thread Form could be utilized in the design of the apparatus of the invention. The cutting of all thread forms by

single point tool or with a geometric die head is known to be very costly. Therefore the search for a low cost commercially available threaded material with American Standard Uniform Thread Form was conducted. Sources were found for low cost 12 foot lengths of roll threaded stainless steel stud stock. The 316 stainless steel material made it highly advantageous for use in a kitchen type tool as it provides corrosion resistance; the low cost provided incentive to pursue its use. This available threaded material has rolled threads and the advantage of low cost could only be achieved with engineering of its use. Several problems were found in the use of rolled threads for this application and required resolution. First the crest of rolled threads form a minute vee from the metal displaced by rolling with this vee being sharp and abrasive. In product testing this sharp crest cut into the tube portion of the drive support. This problem was resolved first by grinding the crest of the thread and secondly by case hardening the inside of the tube portion of the drive support.

It was not obvious to use a thread form whose predominant use is in static applications such as general purpose thread fasteners. It was also not obvious to use this thread form in light of the characteristic advantages apparent with square, acme and buttress threads. The use of the American Standard Uniform Thread Form as a translation thread was not conspicuous as evidenced by all prior art in the search using square, acme or buttress thread forms. Selection and employment of the American Standard Uniform Thread Form required inordinate design skill and extensive testing to develop an effective method of use. In addition to the resolution of the thread crest sharpness with rolled threads it was essential to design a stable method of engagement. The forces toward disengagement are much greater in the application of this thread form on a shaft especially as regards the selection of a mating drive nut component engaging less than one half the drive spindle diameter. This resolution included development of such a component part;

with sufficient thread pitches to provide the strength needed for translation of the forces in operation of the apparatus of the invention. Pressure to maintain engagement was accomplished by manually applied pressure during the cutting operation. This pressure greatly exceeds that required when using the near perpendicular threads of square, acme and buttress in maintaining of engagement. The higher pressure needed when using American Standard Uniform Thread Form presented an additional problem of galling between the threads of the spindle and the mating drive nut. This was resolved by the selection of brass material for the drive nut to mate with the stainless steel drive spindle.

No application of the American Standard Uniform Thread Form as a translation thread was found in the search of prior art. Use of this thread form as in the apparatus of the invention was not obvious but its use engineered as a solution to economic manufacture.